IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Application Serial No. 09/928,172
Filing Date ..... August 9, 2001
Inventor ..... Chris Parfeniuk et al.
Assignee ..... Honeywell International Inc.
Group Art Unit 2823
Examiner ..... W. M. Brewster
Attorney's Docket No. ..... 30-5016-(4015) DIV1
Title: Physical Vapor Deposition Target Constructions

DECLARATION OF ANTHONY F. BEIER UNDER 37 C.F.R. § 1.132

To: MAIL STOP AF
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

From: David G. Latwesen, Ph.D. (Tel. 509-624-4276; Fax 509-838-3424)
Wells St. John P.S.
601 W. First Avenue, Suite 1300
Spokane, WA 99201-3828

I, Anthony F. Beier, an inventor of the subject matter of United States Patent Application Serial No. 09/928,172, do hereby declare the following:

(1) I have reviewed the pending claims of the present Application Serial No. 09/928,172, and have also reviewed the Examiner's cited references of U.S. Pat. Nos. 4,842,706 (Fukasawa), 5,836,506 (Hunt 1), and 6,073,830 (Hunt 2);

(2) Fukasawa does not specifically state the grain size of the aluminum-containing materials nor does it site a specific method that would create such structure. Fukasawa provides a range of materials and a range of grain-size, but does not relate one to the other. Based upon the information provided by

Fukasawa, no determination can be mad to predict a final grain-size in relation to Hunt's process. Based upon standard metallurgical theory however, continued deformation/strain energy and heat treatment temperatures sited in Hunt would negate pre-processing achievements of Fukasawa.

(3) If a high purity aluminum or aluminum alloy target referred to in Fukasawa was then exposed with the diffusion bonding methodology described in Hunt 1, the properties recited in Fukasawa would no longer be valid. Plastic deformation and heat treatment presented in Hunt would modify or negate properties created in Fukasawa; i.e. the two processes are exclusive. No evidence was presented with Fukasawa or Hunt that considered stabilization of target grain-size when combining pre-bonding target metallurgy (Fukasawa) to the bonding application (Hunt).

(4) The smallest grain-size of commercially available aluminum alloy sputtering targets produced with conventional thermal mechanical processing (TMP), (i.e. rolling, forging, heat treating), is in the range of 35 to 50 microns (e.g. Al+0.5%Cu) depending upon the manufacture. Traditional bonding methods such as low temperature solder or epoxy would not be expected to enlarge the grain-size, i.e. these methods do not deform the target material or introduce high enough temperatures to continue grain growth. However, as cited in Hunt as well, low temperature methods generally produce low bond strengths and cannot endure higher wattage sputtering temperature. More dramatic methods such as roll cladding, forging and rolling employ plastic deformation and higher temperatures creating the conditions for continued grain structure modification, e.g. continued

changes in grain size as well as crystallographic orientation.

(5) I hereby state that I have been warned that willful false statements and the like made herein are punishable by fine or imprisonment, or both (18 U.S.C. § 1001) and may jeopardize the validity of the application or any patent issuing thereon; I further hereby state that all statements made herein of my own knowledge are true, and that all statements made on information and belief are believed to be true.

Respectfully submitted,

8/13/03 _____

Date

_____

Anthony F. Beier

OFFICIAL

FAX RECEIVED

AUG 1 5 2003

TECHNOLOGY CENTER 2800